

Lake Wilderness Citizen Advisory Committee

2021 Annual Report

October 15, 2021

The Lake Wilderness Citizen Advisory Committee (LWCAC) presents the 2021 annual report on the aquatic plant management and lake stewardship activities for Lake Wilderness. The LWCAC is comprised of five Regular voting members and one or more Alternate members. The 2021 members include:

- Dave Barber, Chair
- Laurie MacKenzie, Vice Chair
- Paul Wichelmann, Regular Voting Member, then retired
- Charles Benedict, Alternate Member #1, then Regular Voting Member
- Pat Anderson, Alternate Member #2, then Alternate Member #1
- Sam Whitman, Member Representative, King County Parks and Natural Resources
- Amy Shaw, City Member Representative



View from South Shore Looking North
Photo courtesy of Dave Barber

Background on Lake Wilderness Preservation Association (LWPA) and Lake Wilderness Citizen Advisory Committee (LWCAC).



Eurasian milfoil
(*Myriophyllum spicatum*)

In January 1994 Lake Wilderness shoreline property owners Patrick W. Anderson, Roger King, and Mac McMonagle formed the Lake Wilderness Preservation Association (LWPA), a volunteer group. They worked to gather community support from other property owners to manage an infestation of Eurasian milfoil (*Myriophyllum spicatum*) a noxious non-native aquatic plant. The LWPA members partnered with King County Surface Water Management Division and obtained a grant to develop the lake's first Integrated Aquatic Vegetation Management Plan

(IAVMP) in 1997. The IAVMP, as updated in 2004, continues to guide the aquatic plant management options and actions for Lake Wilderness today, in accordance with the Washington State Department of Ecology Aquatic Plant and Algae General National Pollution Discharge Elimination System Permit. A survey conducted during the development of the original IAVMP revealed that Eurasian milfoil had spread rapidly and dominated the lake.

In 1998, LWPA members canvassed Lake Wilderness watershed residents to gather support for the City of Maple Valley's first special assessment district to fund the lake work long-term. The Lake Management District No. 1,



Eurasian milfoil in the
swimming beach - 1998
Photo by LWPA

established by a simple majority of watershed property owners, was formed in 1998 under Ordinance O-98-57. A whole-lake herbicide treatment was performed that same year which successfully eradicated Eurasian milfoil from the lake.

Pursuant to the creation of the special assessment district, a plant advisory board was formed to oversee the annual work program for the lake. The LWPA informally fulfilled that role until 2002 when Maple Valley City Council adopted Resolution R-02-220 creating the Lake Management District Advisory Committee. The Lake Management District Advisory Committee terminated concurrently with the sunset of the special assessment district in 2006.

The current Lake Wilderness Citizen Advisory Committee was created in 2006 by Council adoption of Resolution R-06-495 as amended by R-07-518, R-08-576, and R16-1073. The duties of the LWCAC are; 1) discuss with the city the annual work program for the lake; 2) provide input and suggestions regarding implementation of the annual work program; 3) work with the City in preparation of educational materials relative to the lake and surrounding watershed; 4) provide input to the city on the preparation of an annual report to the City Council, City Manager, and the LWPA regarding the progress on the work program and health of the lake; 5) support a public meeting on the contents of the annual report.

Background on Eurasian milfoil in Lake Wilderness

Following the discovery of Eurasian milfoil in 1994, and the subsequent whole-lake Sonar treatment in 1998 that successfully eradicated it, the lake remained free of Eurasian milfoil for several years. However, it was found again in the fall of 2002 and was subsequently treated with aquatic herbicides in the summer of 2003. Small infestations of milfoil were found in the lake during the summers of 2005, 2006, and again in years 2008 through 2021. Typically these plants have been located in the boat launch bay and the shallow southwest bay, along the western residential shoreline, in the swimming bay and on occasions up near the Lake Wilderness Lodge shoreline. Once established in the lake, Eurasian milfoil propagates by plant fragments as well as rhizomes, and although it produces seeds, propagation by seed is considered less common.

King County reports that Eurasian milfoil is widespread throughout King County in lakes that closely follow the I-5 corridor. Eurasian milfoil can be spread from lake to lake by plant fragments on boats, boat trailers and fishing gear. With the public boat launch on Lake Wilderness, the reintroduction of Eurasians milfoil is to be expected. Ongoing surveys are a critical element in identifying and controlling this invasive noxious weed and are critical for early identification of new infestations of other invasive weeds or pests such as Brazilian elodea or New Zealand mud snails.

Two professional Eurasian milfoil surveys are conducted each year in Lake Wilderness. The LWPA also conducts two volunteer Eurasian milfoil patrols which are typically done over a two week period in advance of the professional surveys. The LWPA volunteers continue to play an active role in outreach and prevention. They provide and staff a booth at the annual fishing derby over a 24 hour period to inspect every boat and trailer for plant fragments before it enters the lake.

Volunteers greet derby participants and discuss the importance of cleaning equipment and fishing gear. They also provide educational information and offer anglers free hot refreshments.

Background on Nuisance Native Aquatic Plants

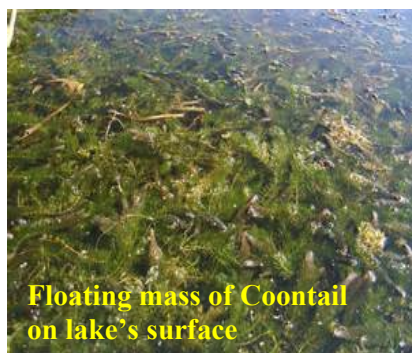
Under favorable conditions, some native pondweed has a tendency for robust growth in the lake's shallow coves and shorelines. It can reach nuisance levels forming dense mats on the lake's surface which can pose a hazard to swimmers and anglers. Herbicide treatments to address nuisance levels of pondweed have been implemented in years 2001, 2004, 2006, 2008, 2009, 2010, 2012 and 2014 through 2021.



Big-leaf pondweed (*Potamogeton amplifolius*)

The LWPA volunteer patrol has been tracking the growth of the big-leaf pondweed since it was identified in the boat launch bay in 2013. Big-leaf pondweed colonies were increasing in distribution along the western, southern, and eastern shoreline. Shoreline property owners expressed concern that it would soon dominate the entire shoreline. Big-leaf pondweed is a beneficial native plant providing excellent habitat for fish and insects; however, it can exhibit rapid early growth achieving nine feet in length as early as May and twenty feet in length

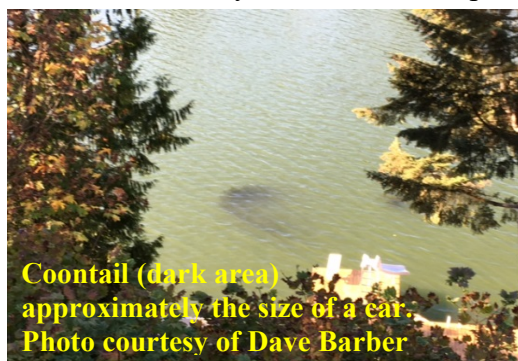
during favorable seasonal conditions. It forms thick mats of floating leaves on the lake surface. In 2019 through 2021 the distribution of the big-leaf pondweed has been reduced. Action to reduce the biomass of big-leaf pondweed is addressed below under *2021 Aquatic Plant Control Recommendation and Actions*.



Floating mass of Coontail on lake's surface

Since 2014 LWPA volunteers identified Coontail (*Ceratophyllum demersum*) as another aquatic plant they've put on their "watch" list. Coontail is a native underwater rootless perennial plant that forms dense colonies that freely float slightly below or on the surface. It can be confused with Eurasian milfoil and likewise can be very intrusive. It can pose a risk to swimmers and can be a hindrance to fishing and boating. The

LWPA have observed that Coontail colonies have been rapidly expanding around the lake. They can grow into large floating masses as seen in the photo above which is approximately the size of a car as shown in the photo on the right.

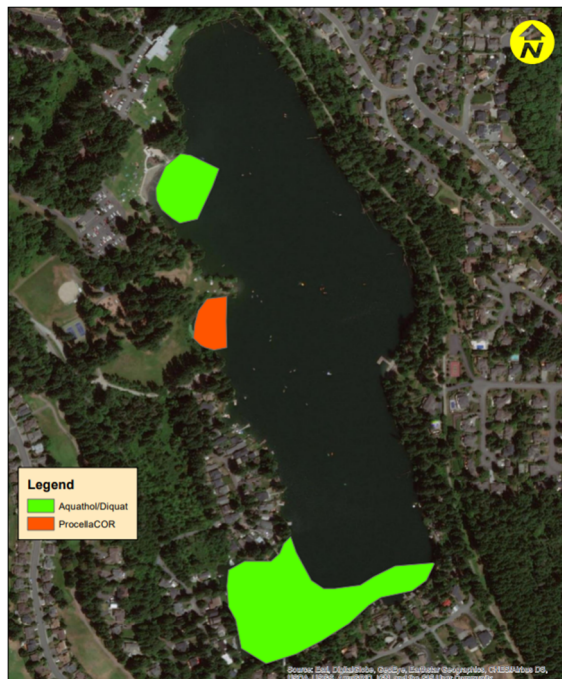
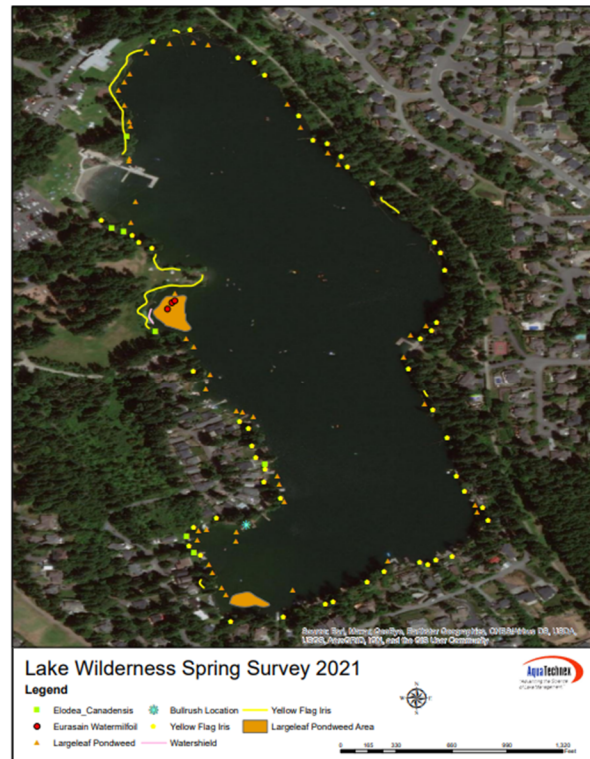


**Coontail (dark area) approximately the size of a car.
Photo courtesy of Dave Barber**

2021 Aquatic Plant Surveys

AquaTechnex, LLC, the city's aquatic plant management vendor, conducted surveys on Lake Wilderness on June 1, 2021 and October 6, 2021. Aquatic biologists conducted a visual systematic survey, by boat and with the use of an underwater drone, of the aquatic plant community along the lake shorelines. They also took rake-toss samples at 5, 10, 15, and 20 foot contours along transects perpendicular to the shoreline at regular intervals around the lake. The LWPA Volunteer Patrol surveyed over several week period preceding the professional surveys. The 2021 LWPA volunteer milfoil patrol participants were Pat Anderson and Dave Barber.

During the spring 2021 surveys, AquaTechnex and the LWPA found one area in the boat launch bay with Eurasian milfoil plant(s) as depicted by the red dots on the survey map to the upper right. Numerous areas were identified where native big-leaf pondweed had reached nuisance levels by mid-May that adversely impacted beneficial use of the lake in designated high-use zones.



Summer 2021 Suggested Treatment Zones

Bulrush was also found to be a nuisance at the shoreline of a property and was selected for treatment. The watershed had grown, and the LWCAC directed AquaTechnex to treat. The map to the lower left shows where treatment was recommended, and subsequently performed.

2021 Aquatic Plant Control Recommendation and Actions

An herbicide treatment was recommended and supported by the LWCAC to decrease the amount of the nuisance big-leaf pondweed, mil-foil, watershield, and Bulrush. Treatment was done on July 27, 2021 in the colored areas shown on the map on the left. Contact herbicides Aquathol and Diquat Dibromide, both effective on Eurasian milfoil and big-leaf pondweed were used. A systemic herbicide product Clearcast (Imazamox) was used for the bulrush and watershield. A systemic herbicide

product Procellacor was used for the Eurasian milfoil. Washington State Designated Swim Area Guidelines, recommend removal of underwater obstructions, including aquatic plants, in designated swimming areas as part of their state-wide effort to reduce drowning incidents. Public



Paul Wichelmann
preparing to sample

notices by mailing, and shoreline postings, as required under the Washington State Department of Ecology permit, were completed in advance of the treatment. Subsequent late season surveys by AquaTechnex and the LWPA Volunteer milfoil patrol found no Eurasian milfoil and a reduction in the pondweed biomass.

Lake Wilderness CAC 2021 Work Plan

In 2021 the LWCAC approved agendas and meeting minutes at four meetings. Due to recommendations from the Department of Public Health regarding the COVID-19 pandemic, many of the typical LWCAC community and education events could not occur. Education outreach activities in 2021 included the following:

- Staffing the booth with LWPA volunteers at the boat launch at the Annual Fishing Derby to hand out education material and inspect boats, trailers and equipment for plant fragments.
- Between September 2017 and September 30, 2021, Nature Vision, an award winning non-profit environmental education firm, provided classroom workshops on watershed education to 2,844 Tahoma School District (TSD) Elementary School children and 45 students between grades 6-12 at the Maple Valley Community Center. After COVID-19 impacted the ability to have in person education, Nature Vision created an education plan including materials that could be downloaded and courses that could be taught remotely to kindergarten through 12th grade. Due to the nature of the program material distribution, the exact number of students that used the materials is unknown, but the number of times that the documents were downloaded could be tracked. Between October 1, 2020 and September 30, 2021, a total of 2,186 documents have been downloaded. Many of these downloads may be teachers who would then distribute the information to their students, parents, and funders. The LWCAC took action to use the annual education budget to increase watershed education efforts. By contracting with Nature Vision, the City is able to provide these programs to TSD at no charge.

Other Lake Wilderness Programs

Volunteer Water Monitoring

The volunteer water quality monitoring program for Lake Wilderness dates back to 1974 when volunteers from the community were trained to collect water samples and coordinate data collection and evaluation with staff from the Metropolitan Municipality of Seattle (METRO) Small Lakes Program. In 1995, following METRO's merge with King County, data collection and evaluation responsibilities transferred to the King County Lake Stewardship program (now the Department of Natural Resources and Parks). The program was then funded by the Wastewater



Van Dorn bottle
used for depth
sampling

Treatment Fund. In 2004 budgetary constraints resulted in those funds being diverted to another priority and King County notified cities that they could no longer fund the volunteer water quality monitoring program for lakes. The City of Maple Valley through Interlocal Agreements with King County began funding the program in 2005.

Volunteer water monitors receive training and equipment from King County. Volunteers measure daily precipitation and lake water levels, surface water temperatures, Secchi transparency, and depth profiles. The program covers a total of twelve sampling events throughout the growing season with routine measurements for concentrations of total phosphorus, total nitrogen, chlorophyll-*a*, soluble reactive phosphorus, nitrate, pH, alkalinity and water color. Volunteers collect samples and coordinate with King County staff for the laboratory analysis.

The Trophic State Index (TSI) is an index that classifies waterbodies based on the total weight of biomass at the time of measurement. The index applies a scale of zero to one hundred based on the summer mean values of three commonly measured lake parameters; Secchi depth, total phosphorus, and chlorophyll-*a*, as indicators of a lake's biomass. Lake Wilderness is considered moderate (mesotrophic) in primary productivity and low (oligotrophic) in Secchi transparency which means that the lake water is very clear. The Volunteer Monitoring Program results indicate water quality in Lake Wilderness is good and phosphorus levels appear to be trending downward.

In 2021 the volunteer water monitor was Paul Wichelmann until he moved, at which point Fred Kreitzberg took over. The final 2021 water monitoring report from King County typically arrives in the first quarter of the following year and will be posted on the City website once received.

Swimming Beach Monitoring

Lake Wilderness swimming beach bacteria monitoring program began in 2008. In 2019 the program began monitoring for *E. coli* rather than fecal coliforms. *E. coli* was found to be a more reliable bacteria indicator of risk to human health. In 2021, nineteen routine weekly samples were drawn on Tuesdays from the left, center, and right side of the Lake Wilderness swimming beach mid-May through mid-September by King County Lake Stewardship staff.

The swimming beach program follows the Ten State Standard for bacteria.

Beach closure occurs when one or both of the following criteria are met: a day's average bacteria value is over 1,000 CFU/100mL (colony forming units per 100 milliliter), or the average of the bacteria values for the three most recent sampling days is over 200 CFU/100 mL calculated using a three-day geometric mean. The swim beach is reopened when the three-day average bacteria value is below 200 CFU/100 mL and the daily bacteria values from the two most recent sampling days are both below 200 CFU/100mL.

Bacteria Value	Concern Level
Individual value < 200 CFU/100 ml	Low Concern - safe for swimming
Individual value \geq 200 & < 1000 CFU/100 ml	Moderate Concern – still safe for swimming
Individual value \geq 1000 CFU/100 ml or geometric mean \geq 200 CFU/100 ml	High Concern – flagged for resample and closure recommended if substantiated

In 2021 the swim beach was closed on one occasion due to high bacteria beginning on June 30, 2021 and re-opened on July 14, 2021. Swimming beach data can be viewed at the King County Water and Land Resources swim beach site:

<https://green2.kingcounty.gov/swimbeach/BeachData.aspx?locator=O717SB&CurrentYear=true>

E-coli measurements are taken only at the swimming beach. We believe that the elevated levels at the beach are not indicative of widespread contamination in the lake and that the remainder of the lake remains safe for swimming.

Cyanobacteria Blooms

No Cyanobacteria blooms were observed in Lake Wilderness in 2018-2020, although the fall lake turnover has been associated with Cyanobacteria blooms in Lake Wilderness on some occasions over the years. In 2021 Lake Wilderness was closed on one occasion due to high toxin levels in an algal bloom sample beginning on September 23, 2021 and re-opened on October 8, 2021.

Cyanobacteria, formerly known as blue-green algae, are naturally occurring in nature and under certain conditions blooms can cause lake water to appear cloudy and green, or form blue-green, brown or red ribbons of scum on the lake surface. Cyanobacteria can produce toxins that pose health risks to humans and animals. Not all blooms produce toxins, however, the only way to tell whether toxins are present is to have samples analyzed for toxicity by a laboratory. The Washington State Department of Ecology Freshwater Algae Control Program provides for free cyanobacteria toxicity testing for Washington's freshwater lakes when blooms or visible scum formations are detected.

Historical toxic bloom data for Lake Wilderness and other area lakes can be found at the Northwest Toxic Algae website at <https://www.nwtoxicalgae.org/>

Harmful Algal Blooms

The City procured a Cyanoflour handheld harmful algal bloom indicator device that can be used to give early identification of harmful algal blooms (HABs). The device records phycocyanin levels and chlorophyll levels and creates a ratio of these levels. Monitoring the ratio over time enables users to predict the onset of HABs. City staff created a testing program for Lake Wilderness to sample once a month at seven locations total; three locations near the shoreline and four locations in the deeper parts of Lake Wilderness as seen on the attached Lake Wilderness HAB Monitoring Points map. As of this report dated October 15, all HAB samples have had low levels that do not indicate a potential bloom.

For the HAB sampling at the start of the 2021 bloom, values were much higher than typical (0.4) but still did not indicate the likelihood of a bloom (1.0 or higher). It was determined after testing that the HAB was no longer calibrated correctly, which means the results from this testing event were likely not accurate. City staff are working with the manufacturer to get the device calibrated again and will perform routine calibration checks.

IRONMAN Event

The City hosted the first IRONMAN event on September 19, 2021. On the Tuesday before the event, September 14, King County collected an algal bloom sample at the swim beach. City staff collected one sample at the swim beach on September 14, and City staff and a member of the LWCAC collected one sample at the swim beach and one sample at that LWCAC member's dock on Lake Wilderness on September 16, 17, and 18. City Staff worked with King County Lakes, King County Public Health, and King County Environmental Lab to deliver the samples to the Environmental Lab for testing on September 14, 16, 17, and 18. Initial values showed a concern for toxins, but later tests showed the toxin levels decreasing. The City and LWCAC previously discussed the ability to treat Lake Wilderness with an algaecide that would eliminate the toxic algal bloom. This algaecide treatment was scheduled for September 16. The algaecide was applied mostly in the swim beach (10 acres received application), but also in the northern part of the lake (2 acres received application). Treatment helped to reduce the algae and toxin levels so that they remained at acceptable levels. The IRONMAN event was able to continue without any impacts to the swim portion.

City staff will work with the LWCAC, King County Lakes, King County Public Health, and King County Environmental Lab to determine what our protocols should be for future IRONMAN events.

Thank you to the City Staff, members of the LWCAC, and staff at King County Lakes, King County Public Health, and King County Environmental Lab for working ensure that the swimming portion of the IRONMAN event could continue without any safety concerns.